

REMARKS

This communication is a full and timely response to the Office Action dated September 23, 2009. Claims 1-3, 5-10, 13-20, and 22-25 remain pending where claims 4, 9, 11, 12, and 21 were previously cancelled. By this communication, claims 1, 7, 13, 16, and 25 are amended. Support for the amended subject matter can be found, for example, at page 4, lines 22-28, and in the paragraph bridging pages 5 and 6 of Applicants' disclosure.

Applicants' claims were variously rejected under 35 U.S.C. §§102 and 103. In particular, claims 1-3, 5-8, 10 and 22-25 stand rejected for alleged anticipation by *Sussman* (EP 0440384), claims 1-5, 6-8, 13, 14, 16, 17, 18, 20, 22, and 25 are rejected for alleged anticipation by *Blangetti* (U.S. Patent Pub. No. 2004/0069466), and claims 13, 14, 16, 17, 19, and 20 are rejected for alleged unpatentability over the *Sussman* patent in view of the *Blangetti* published application. Applicants respectfully traverse these rejections.

As shown in Figures 1-3, a radiator 10 includes a protective silicon-carbide film 18 and an amorphous carbon film 16 sequentially formed on a substrate 12. The amorphous carbon film 16 is deposited through sputter deposition using a high-purity argon gas and pure graphite target in a vacuum chamber. The resulting amorphous carbon film is soft and is susceptible to scratches. Because of the layer structure, radiator 10 exhibits high thermal emissivity in the infrared range.

The aforementioned features are broadly encompassed and in varying scope in independent claims 1, 7, 13, and 16, respectively.

Sussman and *Blangetti* when applied individually or in combination fail to anticipate or render Applicants' claims obvious as alleged.

Sussman discloses a substrate 10 having a diamond film 12 bonded to a surface 14 of the substrate through a metal bonding layer 16. The metal layer 16 is deposited on the surface 14 of the substrate and the diamond film 12, then deposited on the metal layer using a chemical vapor deposition method (CVD). A layer of protective material may be sandwiched between the CVD diamond film and the metal bonding layer. A coating of a thin layer of amorphous or diamond-like carbon can be deposited on the metal layer 16 as the protective material.

Sussman discloses that the diamond film 12 can be used in applications such as a cutting tool, a heat sink, and a wear-resistant surface (i.e. non-soft surface). See Sussman, col. 1, lines 17-20. Based on this statement and the further guidance provided in the disclosure, one of ordinary skill in the art would understand that to achieve the stated objective, *Sussman* is concerned with providing a hard (i.e., non-soft) coating on a mechanical component such as a cutting tool which is subject to wear and mechanical abrasion. Clearly, the use of a soft amorphous layer which is susceptible to scratches would not be appropriate for the structure described in *Sussman*.

In the paragraph bridging pages 8 and 9 of the disclosure, the Examiner asserts that diamond film is formed on an amorphous carbon layer and serves to protect the latter. Even if this interpretation is accurate, *Sussman* fails to describe the amorphous carbon layer as being soft or otherwise as being susceptible to scratches, as recited in the claims. Thus, either of the diamond film 12 or the protective material layers of *Sussman* cannot reasonably be interpreted as being analogous Applicants' claimed amorphous carbon layer, because one of ordinary

skill would understand that each layer as described cannot be soft and susceptible to scratches. Applicants' claims, therefore, are distinguishable over *Sussman*.

Blangetti is directed to a technique in which alternate relatively hard and relatively soft layers of diamond-like carbon are formed on a carbide-coated surface of a heat exchanger. On page 9 of the Office Action, the Examiner concedes that *Blangetti* discloses the use of a soft diamond-like carbon layers that are too hard to be scratched. Applicants add that in disclosing a condensation heat exchanger in which the presence of a final, soft layer is used for its hydrophobic properties, *Blangetti* cannot use a soft amorphous layer which could easily be scratched, as such a property would compromise the integrity of the design. Thus, claims 1, 7, 13, and 16 are distinguishable over *Blangetti*.

In asserting the obviousness rejection, the Examiner acknowledges that *Sussman* fails to disclose or suggest the use of a soft amorphous layer as recited in the claims, and relies on *Blangetti* to remedy this deficiency.

Given the individual disclosures of *Sussman* and *Blangetti*, one of ordinary skill would have no motivation to combine or find that a reasonable nexus exists between the references to realize a reasonable expectation of success. On page 7 of the Office Action, the Examiner alleges that the *Sussman* reference can be modified with a soft layer, hard layer sequence as described in *Blangetti* to achieve a device that is analogous to Applicants' claimed embodiments. What this reasoning fails to address or contemplate, however, is the fact that *Blangetti* discloses a design in which the soft amorphous layer cannot be susceptible to scratches. Stated differently, one of ordinary skill would not have used a soft amorphous layer as recited in Applicant's claims in the *Sussman-Blangetti* combination because doing so

would result in a "protective" layer that compromises the required hydrophobic properties (see *Blangetti*), thereby degrading performance, and rendering the resulting device incapable of achieving the stated objective. Moreover, Sussman fails to disclose an embodiment in which a soft amorphous layer is useable or otherwise desirable in the design. If the proposed modification renders the prior art invention being modified unsatisfactory for its intended purpose, then there is no suggestion or motivation to make the proposed modification. MPEP §2143.01, 8th Ed., August 2001, Rev. July 2008 (citing *In re Gordon*, 733 F.2d 900, 221 USPQ 1125 (Fed. Cir. 1984)).

In summary, *Sussman* and *Blangetti* when applied individually and collectively as alleged by the Examiner fail to disclose every feature and/or the combination of features recited in Applicants' claims. In particular, the applied references fail to disclose or suggest a soft amorphous carbon layer is comprised of a material composition that is susceptible to scratches. For this reason Applicants' claims 1, 7, 13, and 16 are neither anticipated nor rendered obvious by these references.

In addition to the above features, claims 7 and 25 also recite that each of the metallic carbide layer, the amorphous carbon layer, and the protective layer has a thickness of less than 1 micrometer. As shown in Figure 3 of Applicants' disclosure, emissivity is impacted by the thickness of these layers and particularly the amorphous carbon layer. In contrast, *Sussman* discloses the use of a diamond film having a thickness from 5 microns to 3000 microns. *Blangetti* discloses the use of amorphous silicon layers having between 0.1 and 2 micrometers. However, there is no discussion in these references of each of a metallic carbide layer, an amorphous carbon layer, and a protective layer having a thickness of less than 1 micrometer, as

recited in claim 7. The combination of features recited in claims 7 and 25 enable the radiator structure to have an emissivity of at least 30% for radiation of wavelengths in the range of 3 μ m to 5 μ m. Therefore, in reciting the thicknesses of the device layers along with specific features of the soft amorphous carbon layer, the applied references fall short of describing an analogous structure that anticipates or renders independent claims 7 and 25 obvious.

On pages 3 and 6 of the Office Action and regarding claims 3 and 20, respectively, the Examiner alleges that *Sussman* discloses an amorphous carbon layer and/or carbide layer having a thickness in the range of 0.1 micrometers to 1.0 micrometer. Applicants disagree. *Sussman* discloses that the diamond film is deposited to a thickness from 5 microns to 3000 microns. This range neither overlaps nor is encompassed in the range recited in claim 3 as one of ordinary skill would understand that 1 micrometer is less than 5 microns. The combination of the thickness of the amorphous carbon layer and/or the carbide layer, along with the substrate and protective layers enable the claimed radiator to have a structure that exhibits high thermal emissivity. For at least these reasons, claim 3 is distinguishable over the applied references.

As set forth in MPEP § 2131, to anticipate a claim, the reference must teach every element of the claim. *Verdegaal Bros. v. Union Oil Co. of California*, 814 F.2d 628, 631, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987). "[U]nless a reference discloses within the four corners of the document not only all of the limitations claimed but also all of the limitations arranged or combined in the same way as recited in the claim, it cannot be said to prove prior invention of the thing claimed and, thus, cannot

anticipate under 35 U.S.C. § 102." *Net MoneyIN, Inc. v. VeriSign, Inc.*, 545 F.3d 1359, 1371 (Fed. Cir. 2008) (emphasis added).

Furthermore, the courts have established that the Office has the initial burden of establishing a **factual basis** to support the legal conclusion of obviousness. In re Oetiker, 977 F.2d 1443, 1445, 24 USPQ2d 1443, 1444 (Fed. Cir. 1992). For rejections under 35 U.S.C. § 103(a) based upon a combination of prior art elements, in KSR Int'l v. Teleflex Inc., 127 S.Ct. 1727, 1741, 82 USPQ2d 1385, 1396 (2007), the Supreme Court stated that "a patent composed of several elements is not proved obvious merely by demonstrating that each of its elements was, independently, known in the prior art." "Rejections on obviousness grounds cannot be sustained by mere conclusory statements; instead, there must be some **articulated reasoning with some rational underpinning** to support the legal conclusion of obviousness." In re Kahn, 441 F.3d 977, 988, 78 USPQ2d 1329, 1336 (Fed. Cir. 2006) (emphasis added).

Because the rejection fails to meet the judicial-established standards for anticipation and obviousness, withdrawal of all rejections under 35 U.S.C. §§102 and 103 is deemed appropriate and hereby requested.

CONCLUSION

Based on the foregoing amendments and remarks, Applicants respectfully submit that claims 1-3, 5-10, 13-20, and 22-25 are allowable and this application is in condition for allowance. In the event any unresolved issues remain, the Examiner is encouraged to contact the undersigned.

Respectfully submitted,

BUCHANAN INGERSOLL & ROONEY PC

Date: February 23, 2010

By: /Shawn B. Cage/
Shawn B. Cage
Registration No. 51522

Customer No. 21839
703 836 6620